

# Realizing Sustainability

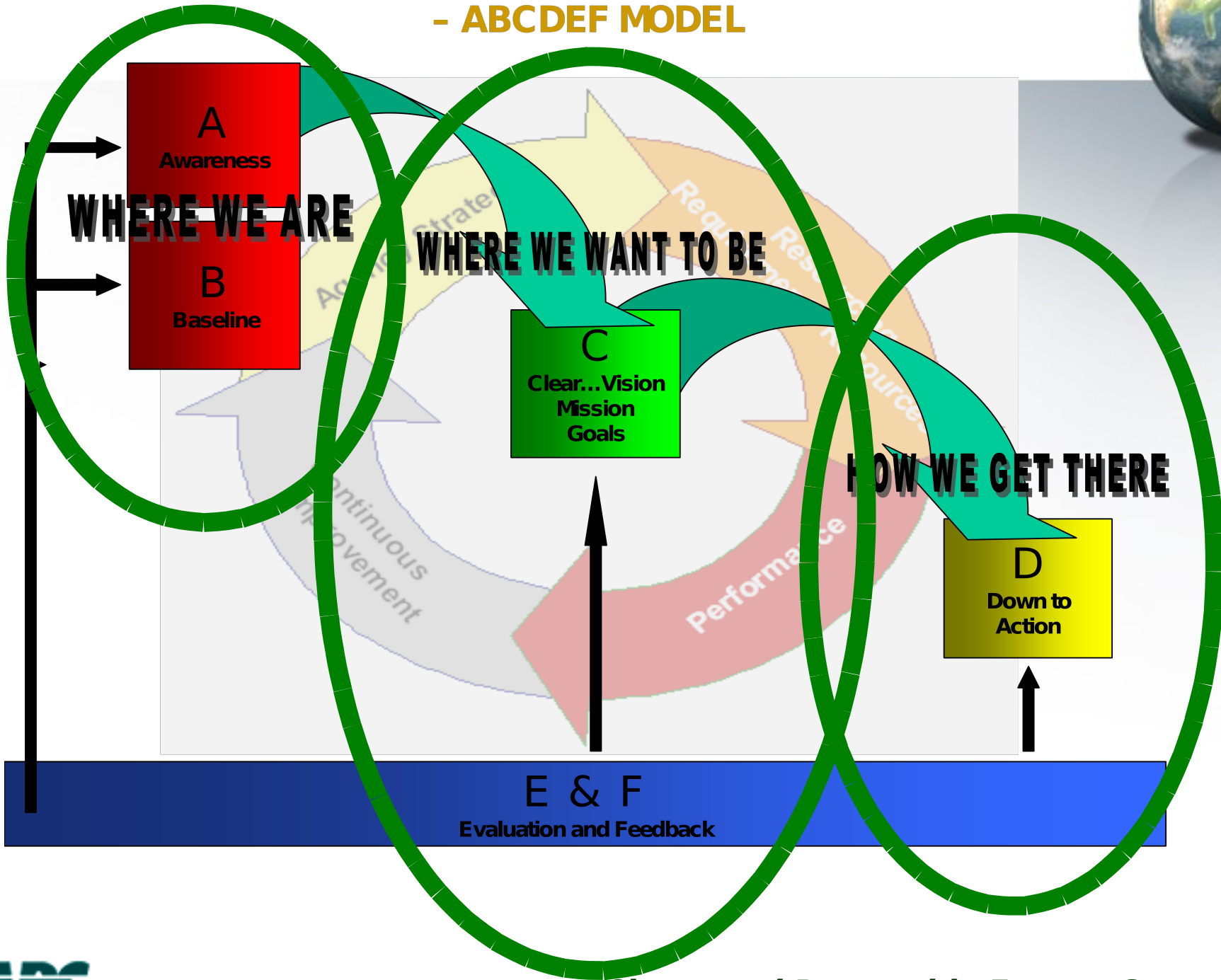
Fort Benning Sustainability Goals  
Setting Workshop

Karl R. Rábago  
krabago@harc.edu  
281.364.4035

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# STRATEGIC PLANNING FOR SUSTAINABILITY - ABCDEF MODEL



# Framing Issues - Where We Are



# 34 Years Later . . .



# 56 Years Later . . .



By and large, our present problem is one of attitudes and implements.

We are remodeling the Alhambra with a steam-shovel, and we are proud of our yardage.

We shall hardly relinquish the shovel, which after all has many good points, but we are in need of gentler and more objective criteria for its successful use.

*Aldo Leopold - A Sand County Almanac*



# Why Focus on Sustainability?



***Growing demand is on a collision-course with declining resources***

- Current consumption and pollution trends *will* leave future generations with more problems and fewer solutions options.
- All human and natural activity must occur within the finite physical constraints of the planet Earth.
- The pace of degradation and the magnitude of the problem are increasing, in spite of impressive successes.

# What is Sustainability?



- [Sustainable development] meets the needs of the present without compromising the ability of future generations to meet their own needs
- A sustainable Army simultaneously meets current as well as future mission requirements worldwide, safeguards human health, improves quality of life, and enhances the natural environment
- Sustainability means living and working as if you really believe in a tomorrow





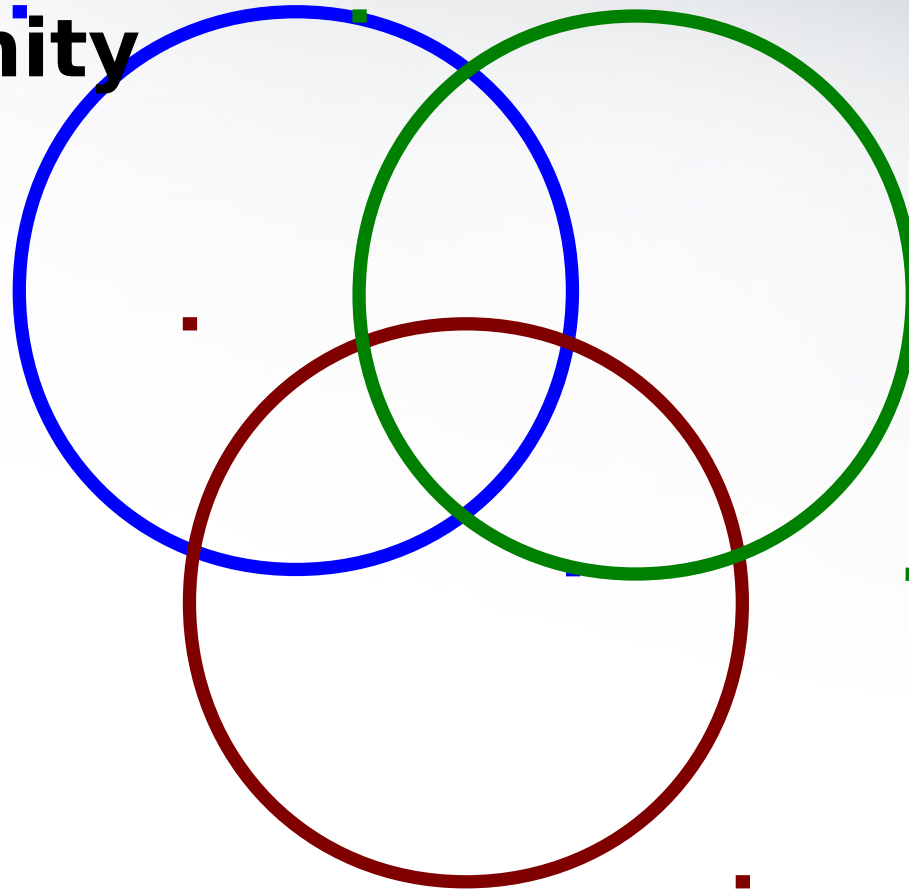


# Sustainable Development



**Community**  
***Society***

**Mission**  
***Economy***



**Environment**

# A Few Reminders



- “Resource” is a topic that embodies both economic *and* physical attributes
- We are NOT going to run out of any particular physical resource - *Did a shortage of stones end the stone age?*
- We ARE going to run out of willingness to pay (in \$, frustration, and consequences) for some resources and in some locations
- So, at \$10 billion dollars or 1 million cases of cancer or 1 million refugees per pound or per barrel or per bushel, we have an infinite supply . . . *What are you willing to pay?*

# Why Sustainability?



- **Image** – Creation, enhancement
- **Ethics** – Organizational & individual responsibility
- **Advantage** - Competitive advantage, prevent disadvantage
- **Risk** - Economic, regulatory, perception
- **Money** - Cost savings, opportunity costs for capital investments

# Sustainability is NOT . . .



- Religion (or anti-religion)
- Formulaic
- Fragile
- Final
- Free



# **A Few Thoughts of Special Application to the Mission of the United States Army**



# Sustainability = Security



- Sustainability is about meeting needs today and tomorrow
- Security is about freedom from fear of privation or want - today and tomorrow
- Security is about balancing:
  - Self-Sufficiency vs. Reliance on External Resources
  - and*
  - Externalizing costs vs. Internalizing costs

***Sustain the Mission, Secure the Future***



**Sustainability**

**=**

**Security**

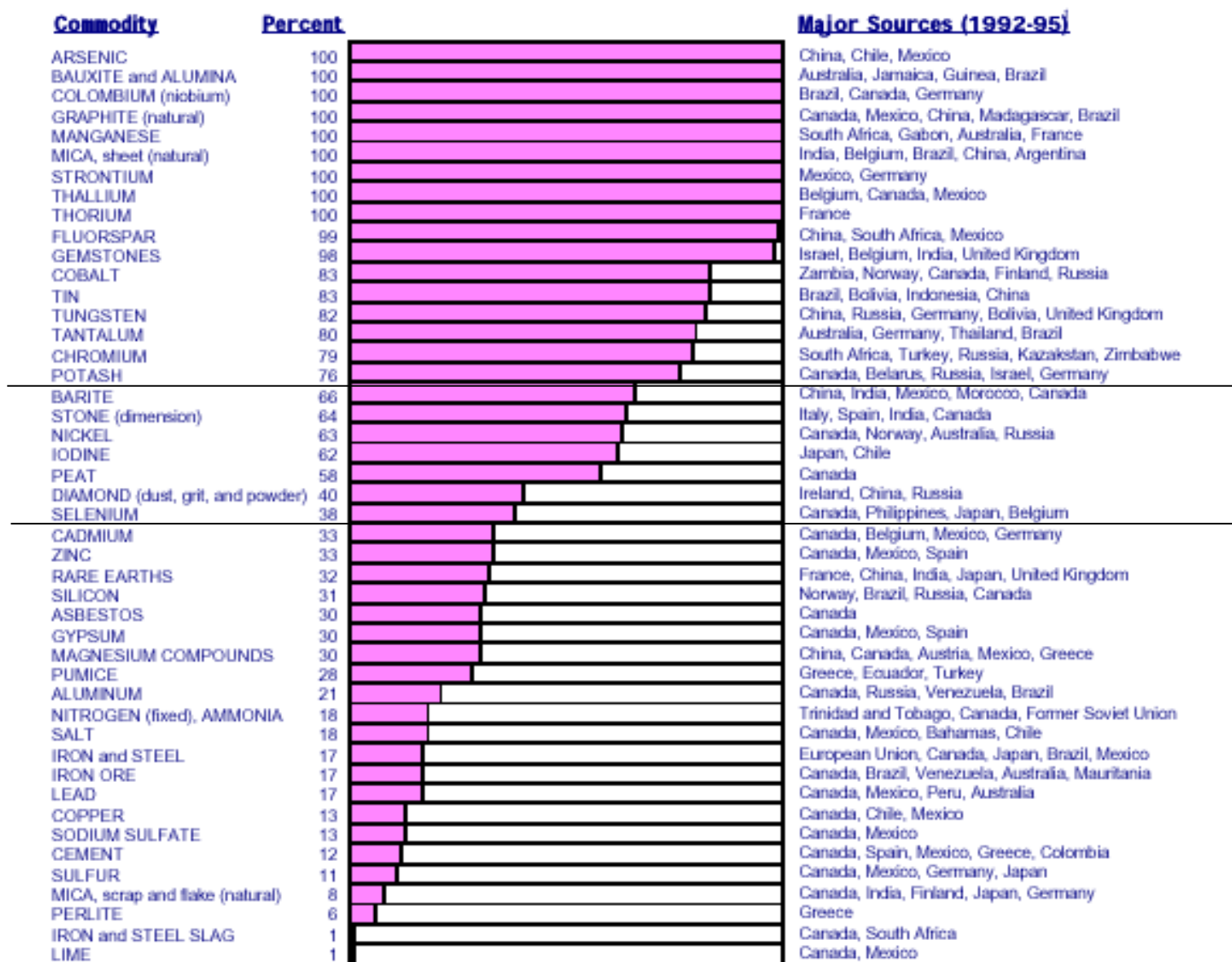
**=**

**Sustainability**





# 1996 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS



# A Sustainable Installation?



*Much more than Environmental Management (of course, EM is vital)*

- Obtaining adequate resources reliably, and without regrets
- Continuous and strengthened support for training, warfighting missions
- No impediments to future mission planning, execution, completion
- Neighbors, not tenants
- Leaders

# Potential Installation Benefits



- G-1: Happier, healthier, more productive people, with lower wage and cost pressure
- G-2: Easier management of technical information assets, less vulnerability to unpredictable developments
- G-3: Less complex and costly operations planning, more resources deployable to primary missions
- G-4: More reliable logistical support, fewer constraints
- G-5: More supportive civil population; community as resource

# What is the Global logic?



- The easiest war to win is the one you never have to fight
- Environmental/resource insecurity will be the primary cause of instability this century (Why should this one be different?)
- Sustainable geopolitical states/regions are less vulnerable to insecurity, hence instability, hence conflict
- An Army that is not sustainable at home cannot lead another nation to sustainability



# And When Conflict Occurs . . .



- Sustainable installations are less vulnerable to attack
- Sustainable home installations allow valuable resources to be devoted to warfighting
- Sustainable home installations impose less wartime stress on neighborhood communities
- Soldiers perform better knowing dependents are happy, healthy and safe

# **Some Reminders - Things You Forgot You Knew**



# Nature Doesn't Compromise



Nature Optimizes:

*The Pelican is not a compromise between a seagull and an otter . . . It is simply the best Pelican that Nature could so far devise.*

# Goals from The Strategy



- Foster a sustainability ethic
- Strengthen Army operations
- Meet test, training and mission requirements
- Minimize impacts and total ownership costs
- Enhance well-being
- Drive innovation



# The Logic of Natural Capitalism



- Dramatically improve efficiency
- Close the loops, biomimicry
- Align interests
- Reinvest in and restore natural capital

[www.natcap.org](http://www.natcap.org)

# The Logic of Natural Step



In a sustainable society, nature is not subject to systematically increasing:

- concentrations of substances extracted from the earth's crust;
- concentrations of substances produced by society;
- degradation by physical means and, in that society. . .
- human needs are met worldwide.

[www.naturalstep.org](http://www.naturalstep.org)

# Commoner's Four Rules



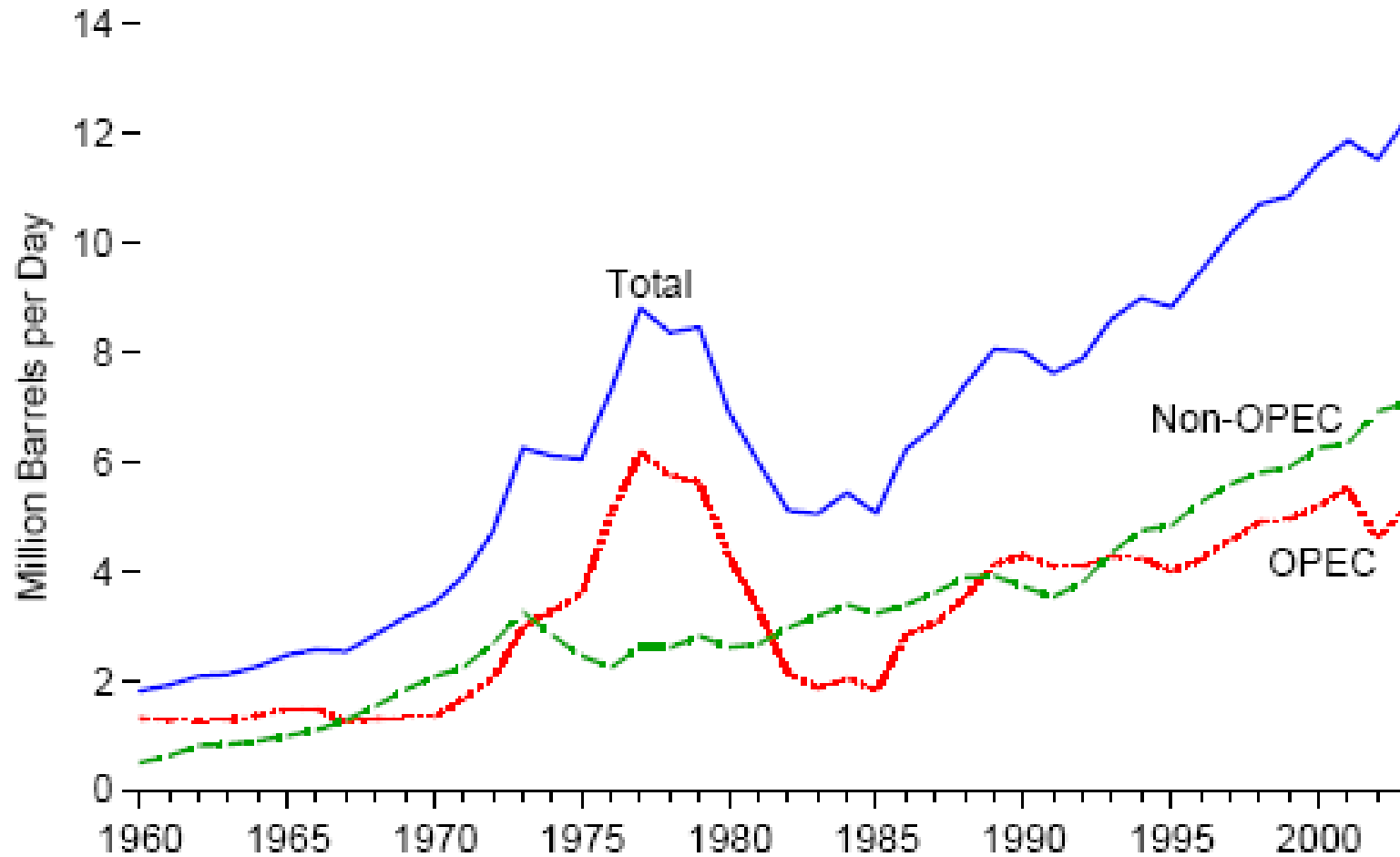
. . . of Ecology

1. Everything is Connected to Everything Else
2. Everything Has to Go Somewhere
3. Nature Knows Best
4. There is No Such Thing as a Free Lunch

# No Free Lunch

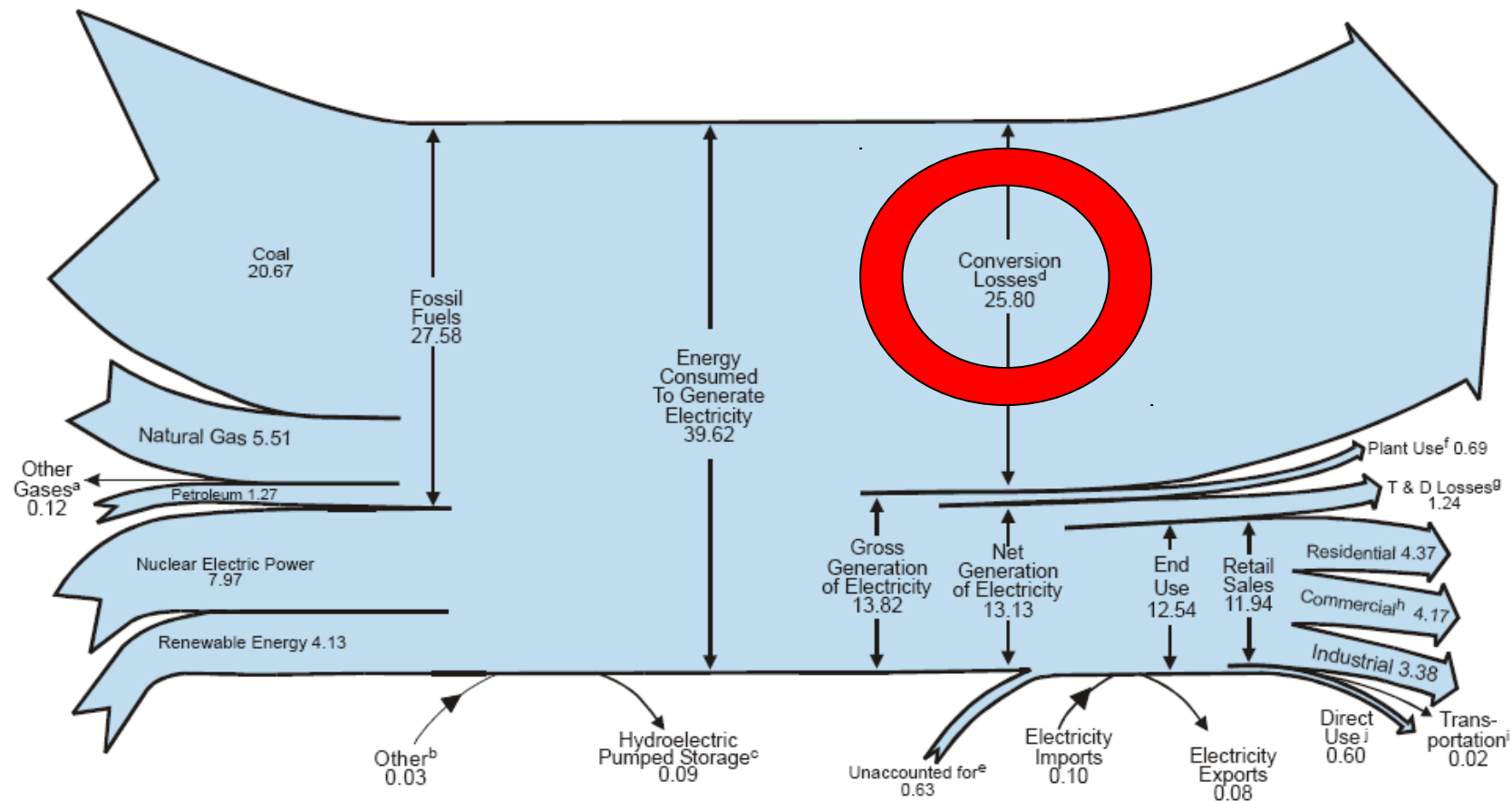


Total, OPEC, and Non-OPEC, 1960-2003



# Everything Has to Go Somewhere

Diagram 5. Electricity Flow, 2003  
(Quadrillion Btu)



<sup>a</sup> Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.

<sup>b</sup> Batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

<sup>c</sup> Pumped storage facility production minus energy used for pumping.

<sup>d</sup> Approximately two-thirds of all energy used to generate electricity. See note "Electrical System Energy Losses," at end of Section 2.

<sup>e</sup> Data collection frame differences and nonsampling error.

<sup>f</sup> Electric energy used in the operation of power plants, estimated as 5 percent of gross generation. See note "Electrical System Energy Losses," at end of Section 2.

<sup>g</sup> Transmission and distribution losses (electricity losses that occur between the point of generation and delivery to the customer) are estimated as 9 percent of gross generation. See note "Electrical System Energy Losses," at end of Section 2.

<sup>h</sup> Commercial retail sales plus approximately 95 percent of "Other" retail sales from Table 8.9.

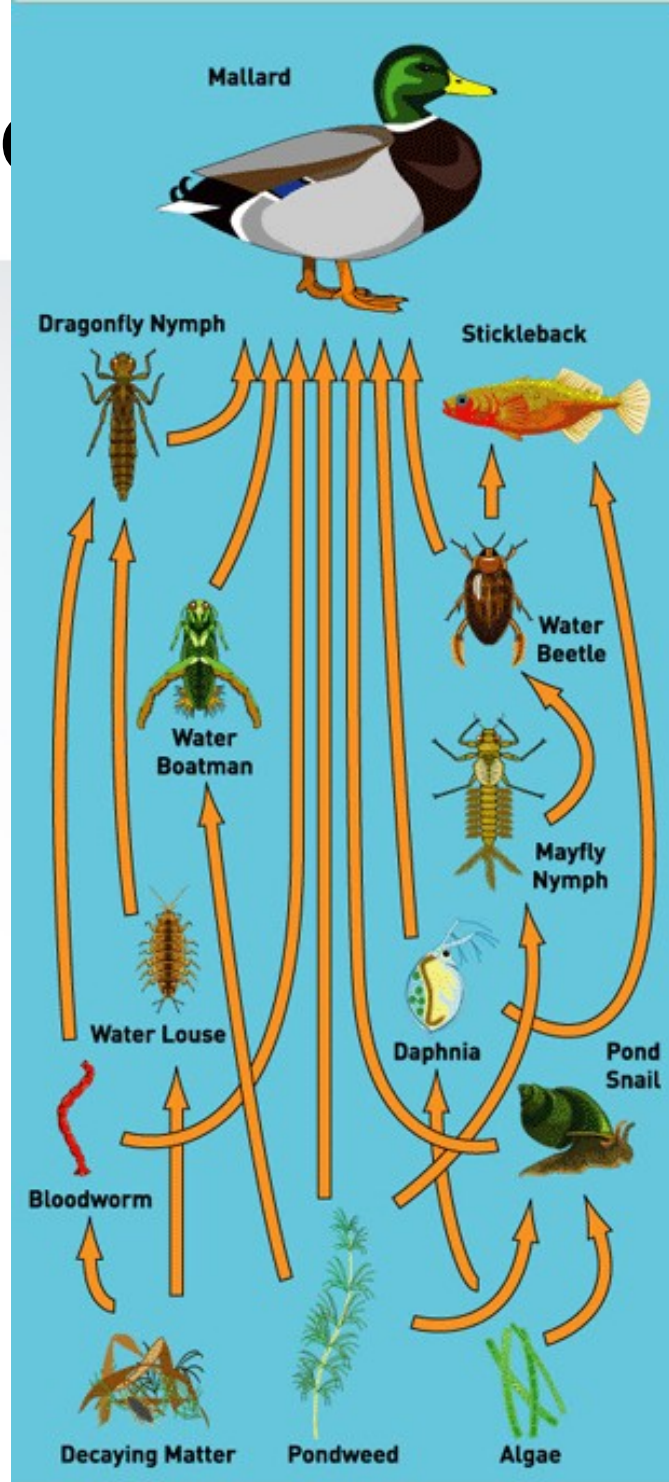
<sup>i</sup> Approximately 5 percent of "Other" retail sales from Table 8.9.

<sup>j</sup> Commercial and industrial facility use of onsite net electricity generation; and electricity sales among adjacent or co-located facilities for which revenue information is not available.

Note: Totals may not equal sum of components due to independent rounding.

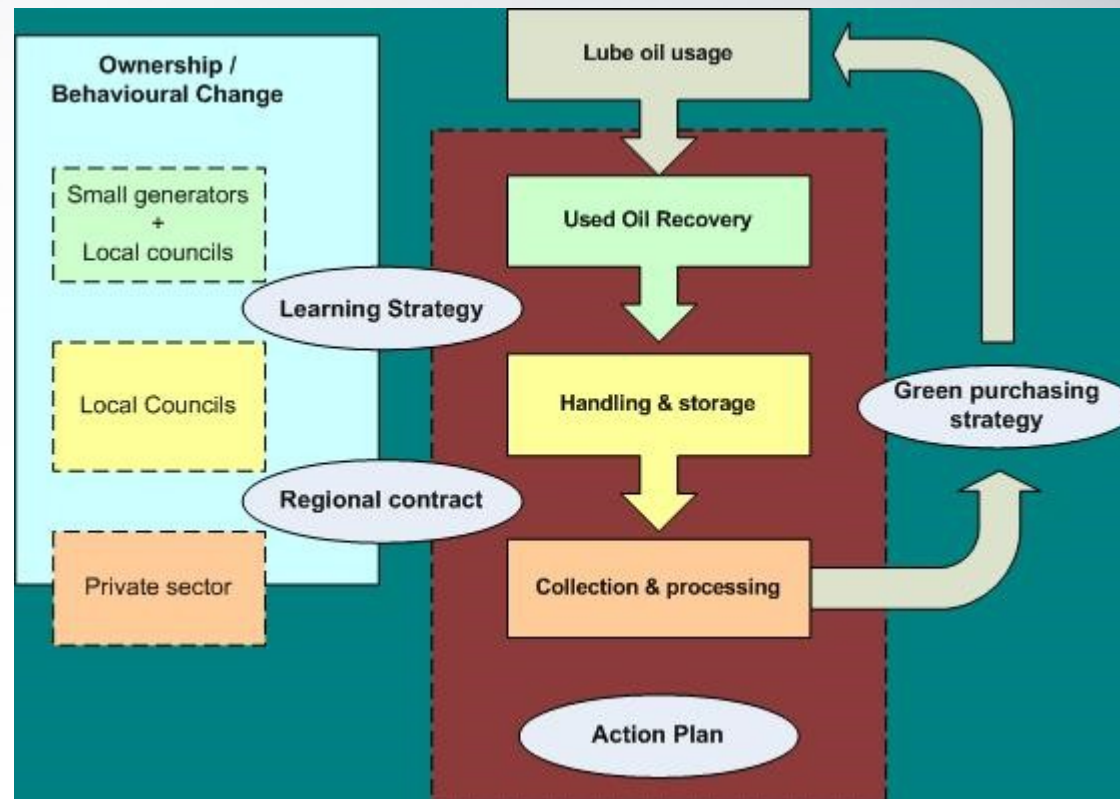
Sources: Tables 2.1b-2.1e, 8.1, 8.4a, and A6 (column 4).

# Webs of Life

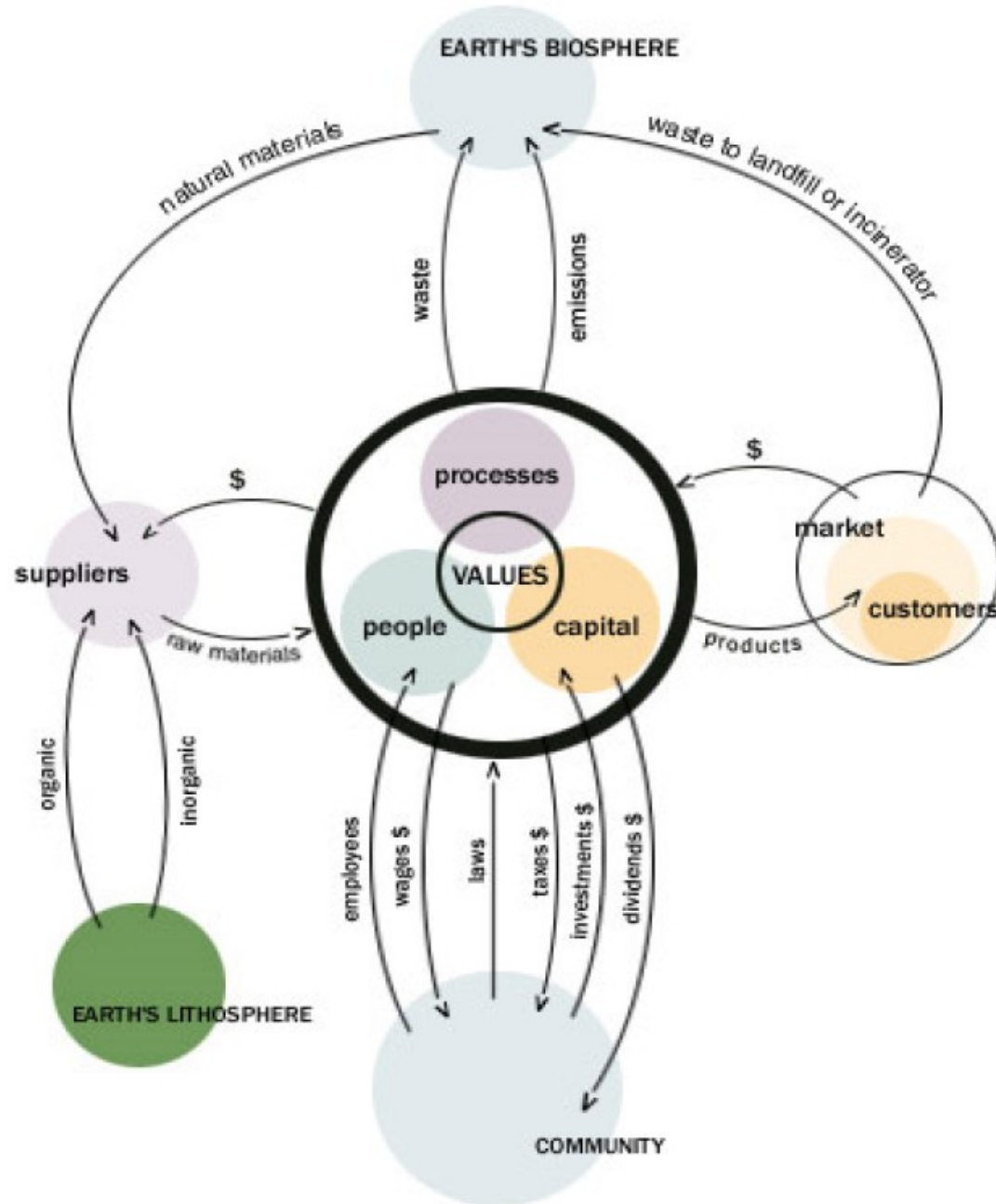




# Closing the Loop

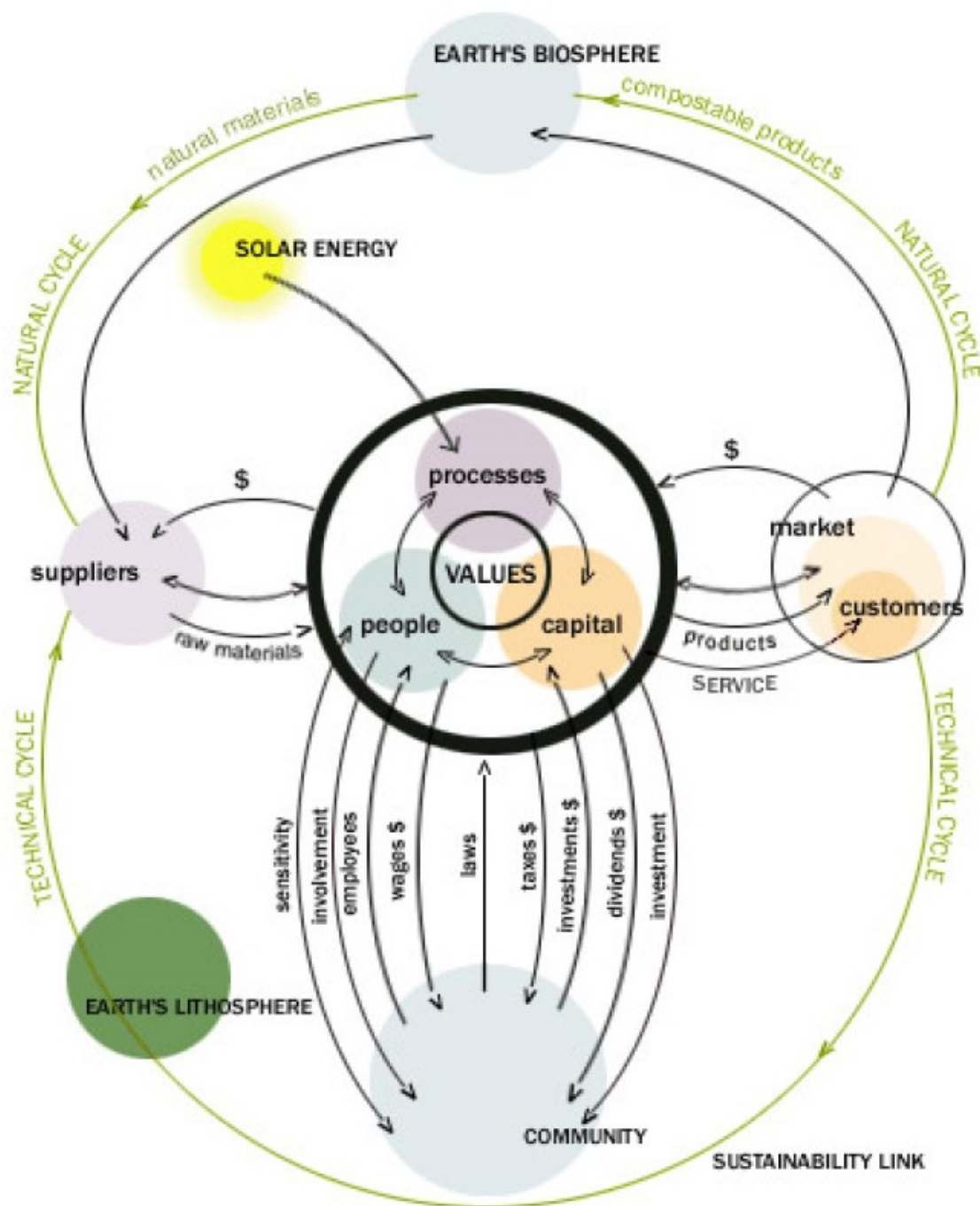


THE INTERFACE MODEL  
Typical Company of the 20th Century

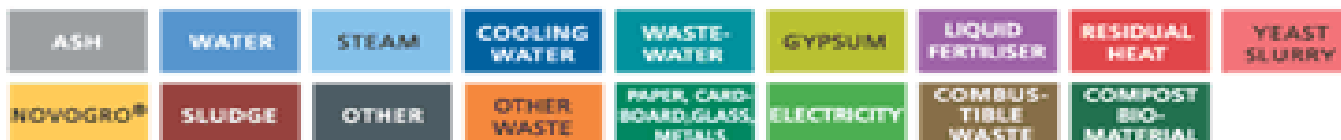
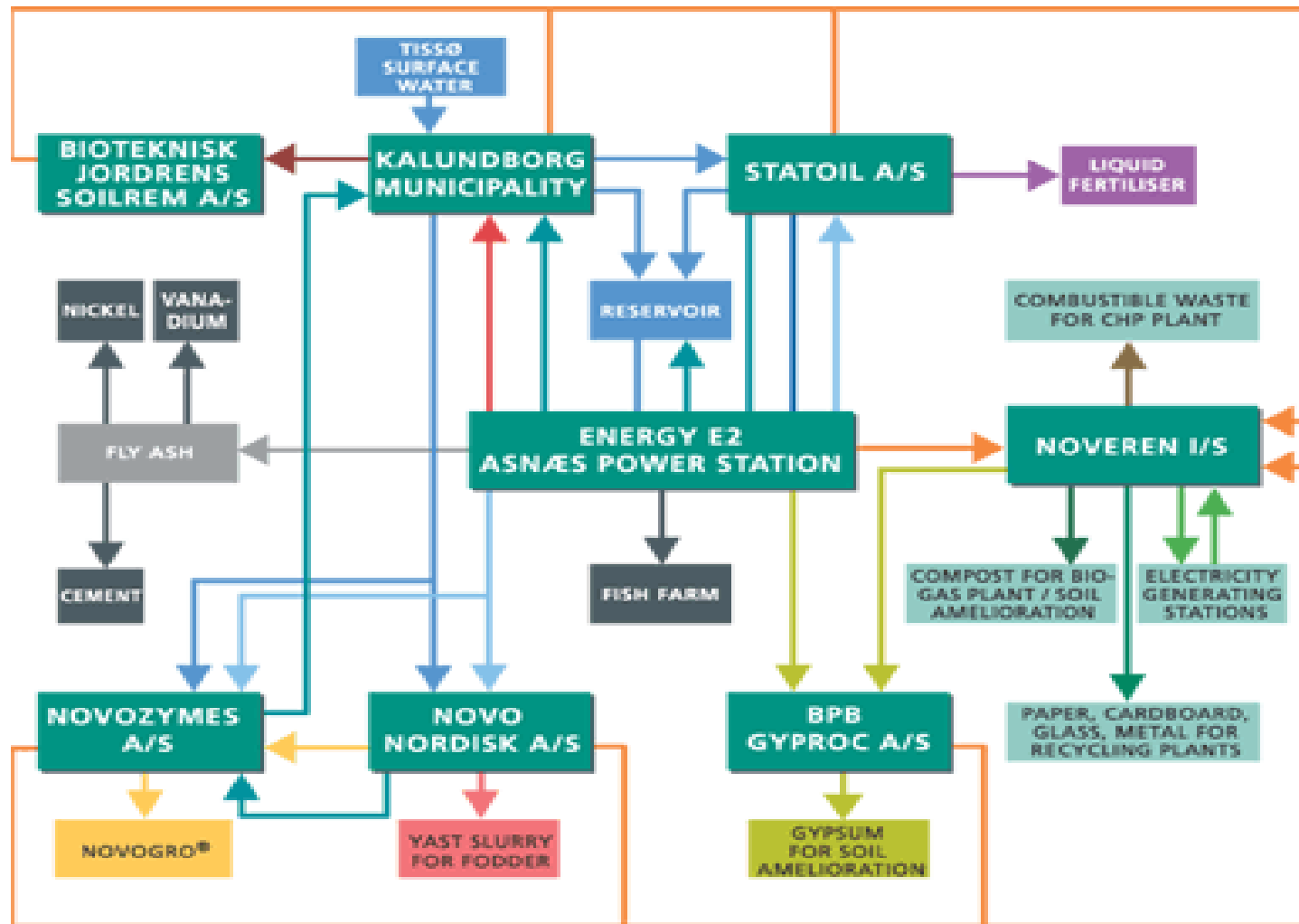


**Works for  
enterprises,  
too.**

# THE INTERFACE MODEL Prototypical Company of the 21st Century



# Better Communities



# Some of the Benefits



- **Total water consumption** - Reduced the overall consumption by 25% by recycling the water and by letting it circulate between the partners. Savings/year: 1.9 million cubic metres ground water, 1 million cubic metres surface.
- **Oil** - Reduced oil consumption by 20,000 tonnes per year, corresponding to a 380-tonne reduction of sulphur dioxide/year. The major reductions have been achieved by Novozymes A/S, Novo Nordisk A/S and Statoil that have used process steam from the production at Asnæs Power Station.
- **Ash** - The combustion of coal and orimulsion at Asnæs Power Station results in approx. 80,000 tonnes of ash, which are used in the construction and cement industries for the manufacturing of cement or the extraction of nickel and vanadium.
- **Gypsum** - Every year BPB Gyproc A/S receives up to 200,000 tonnes of gypsum from Asnæs Power Station. This figure corresponds to the large majority of the company's annual consumption. The gypsum substitutes the natural gypsum used in the production of plasterboards.
- **NovoGro®** - NovoGro® from Novozymes A/S substitutes the use of lime and part of the commercial fertiliser on approximately 20,000 hectares of farmland.
- **Wastewater** - The collaboration of Novozymes A/S, Asnæs Power Station and Kalundborg Municipality, in the area of wastewater treatment, reduces the environmental impact on Jammerland Bugt considerably.
- **Sludge** - The recycling of sludge stemming from the treatment plant brings about a reduction in production time at A/S Bio-teknisk Jordrens Soilrem, synonymous with expenditure cuts and improved economy.



# But Wait! There's More



- **Other Waste (per year):**
  - 13,000 tonnes of newspaper / cardboard which after a quality check are sold to cardboard and paper consuming industries in Denmark, Sweden and Germany producing new paper, new cardboard, egg boxes and trays for e.g. the health sector.
  - 7,000 tonnes of rubble and concrete that are used for different surfaces after crushing and sorting.
  - 15,000 tonnes of garden / park refuse delivered as soil amelioration in the area.
  - 4,000 tonnes of bio waste from households and company canteens. The bio waste is used in the compost and biogas production.
  - 4,000 tonnes of iron and metal, which is resold after cleaning for recycling.
  - 1,800 tonnes of glass and bottles that are sold to producers of new glass.
- **Advantages of the Symbiosis**
  - Recycling of by-products. The by-product of one company becomes an important resource for another company.
  - Reduced consumption of resources, e.g. water, coal, oil, gypsum, fertiliser, etc.
  - Reduced environmental strain: reduced CO<sub>2</sub> and SO<sub>2</sub> emissions, reduced discharges of wastewater and less pollution of watercourses etc.
  - Improved utilisation of the energy resources. Waste gases are used in the energy production.



# Three Disciplines for “Getting it Done”



# Three Disciplines

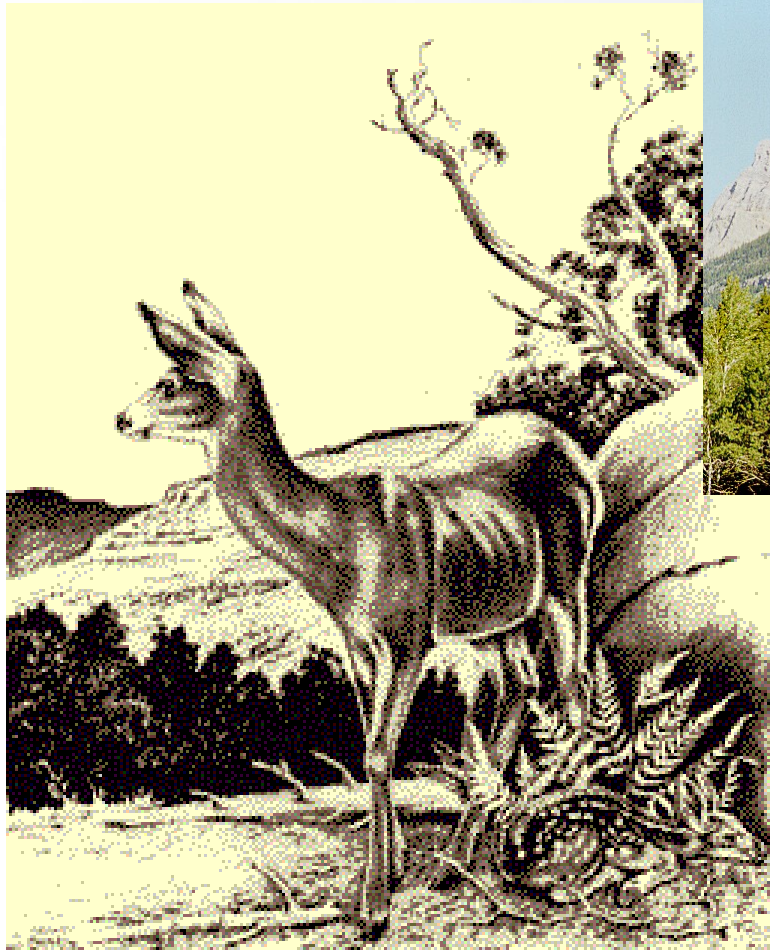


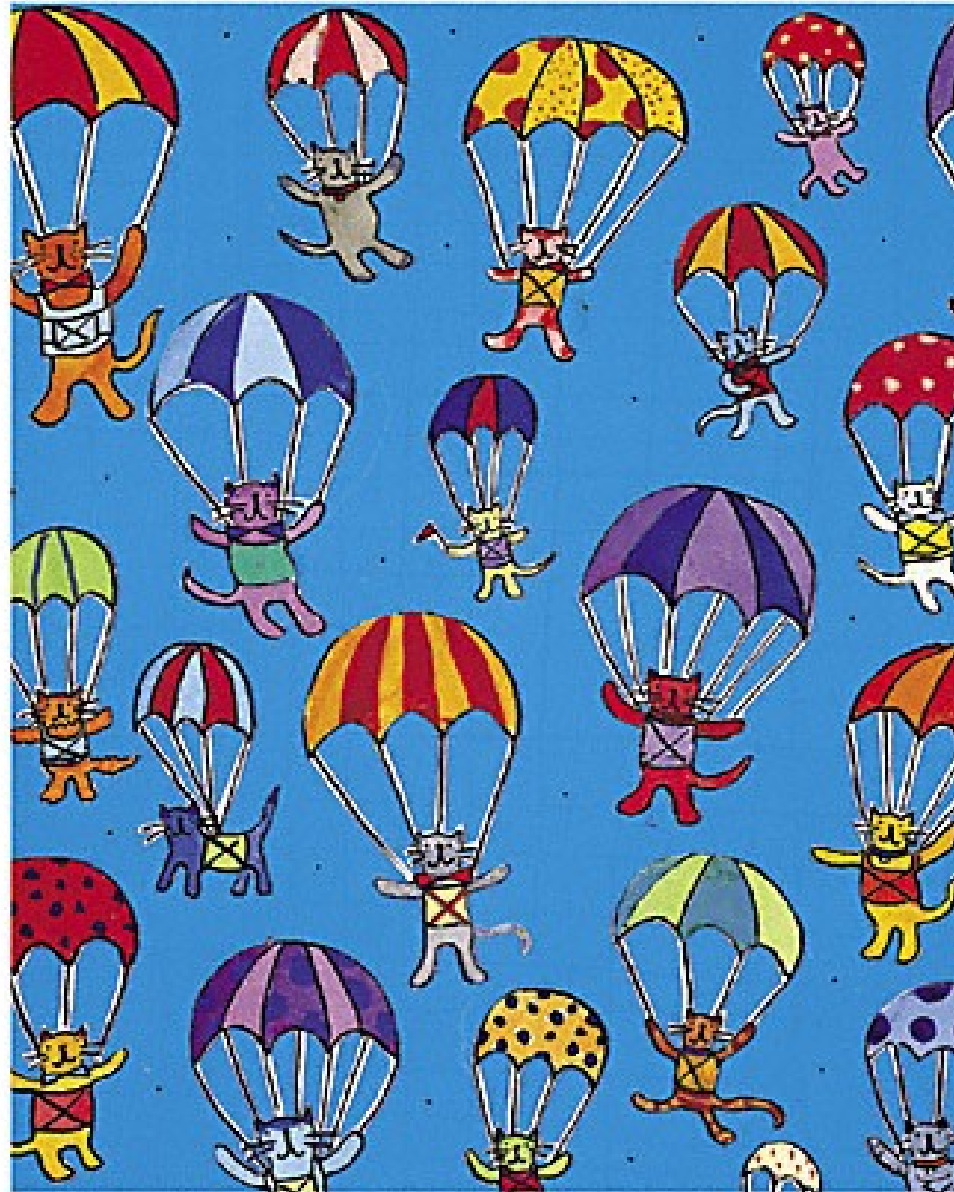
- Systems Thinking
- Solving for Multiple Criteria
- Managing Technological Change

# Three Disciplines for “Getting it Done”

Systems Thinking









# Three Disciplines for “Getting it Done”

Solving for Multiple Criteria



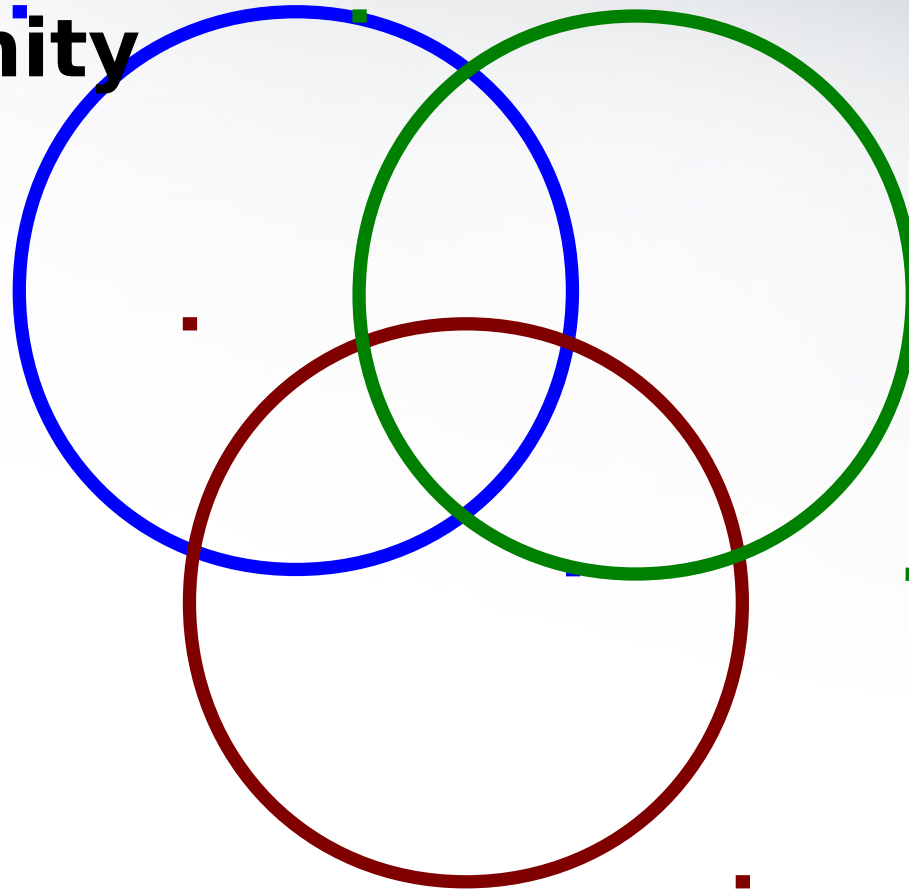


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# Three Disciplines for “Getting it Done”

Managing Technological  
Change

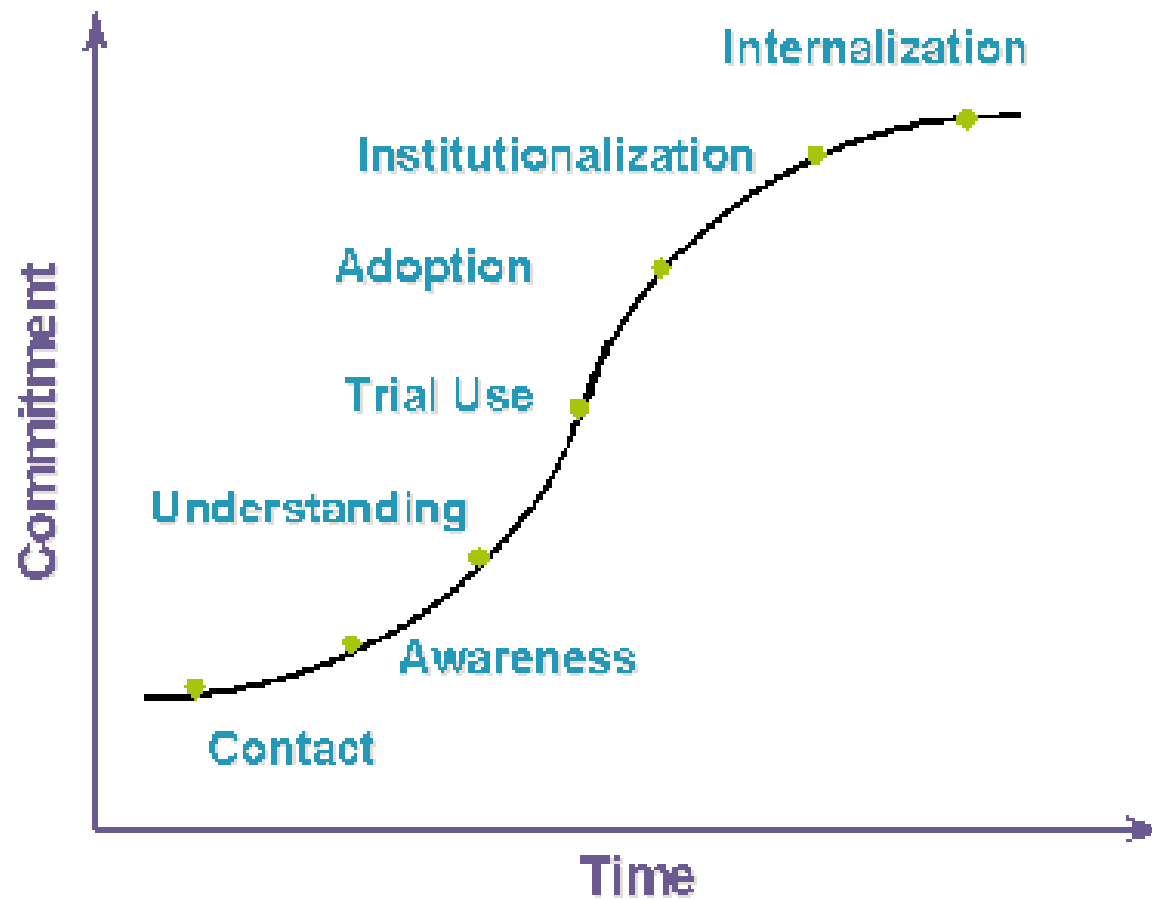


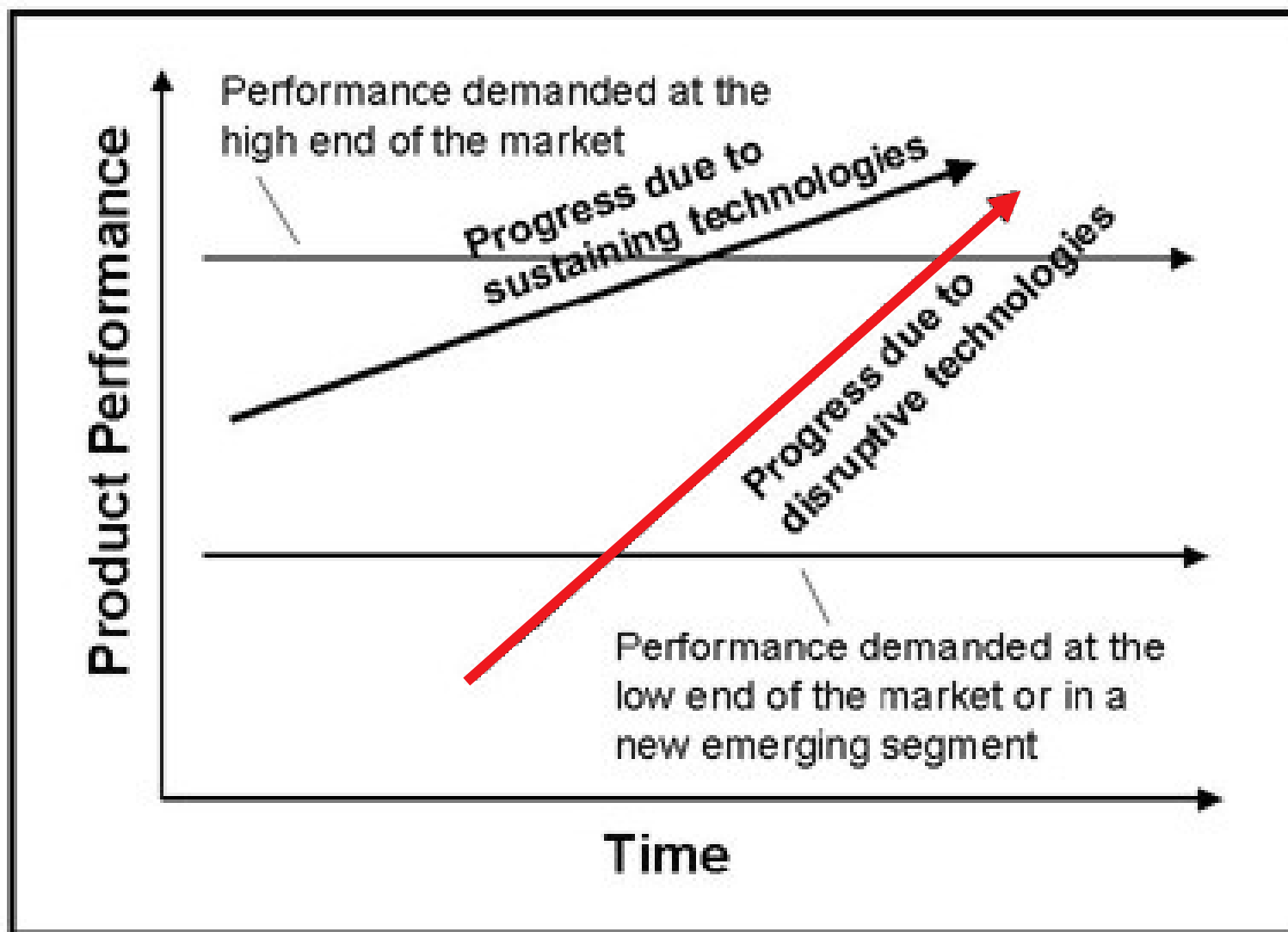






Figure 2. *The standard technology adoption S-curve.*











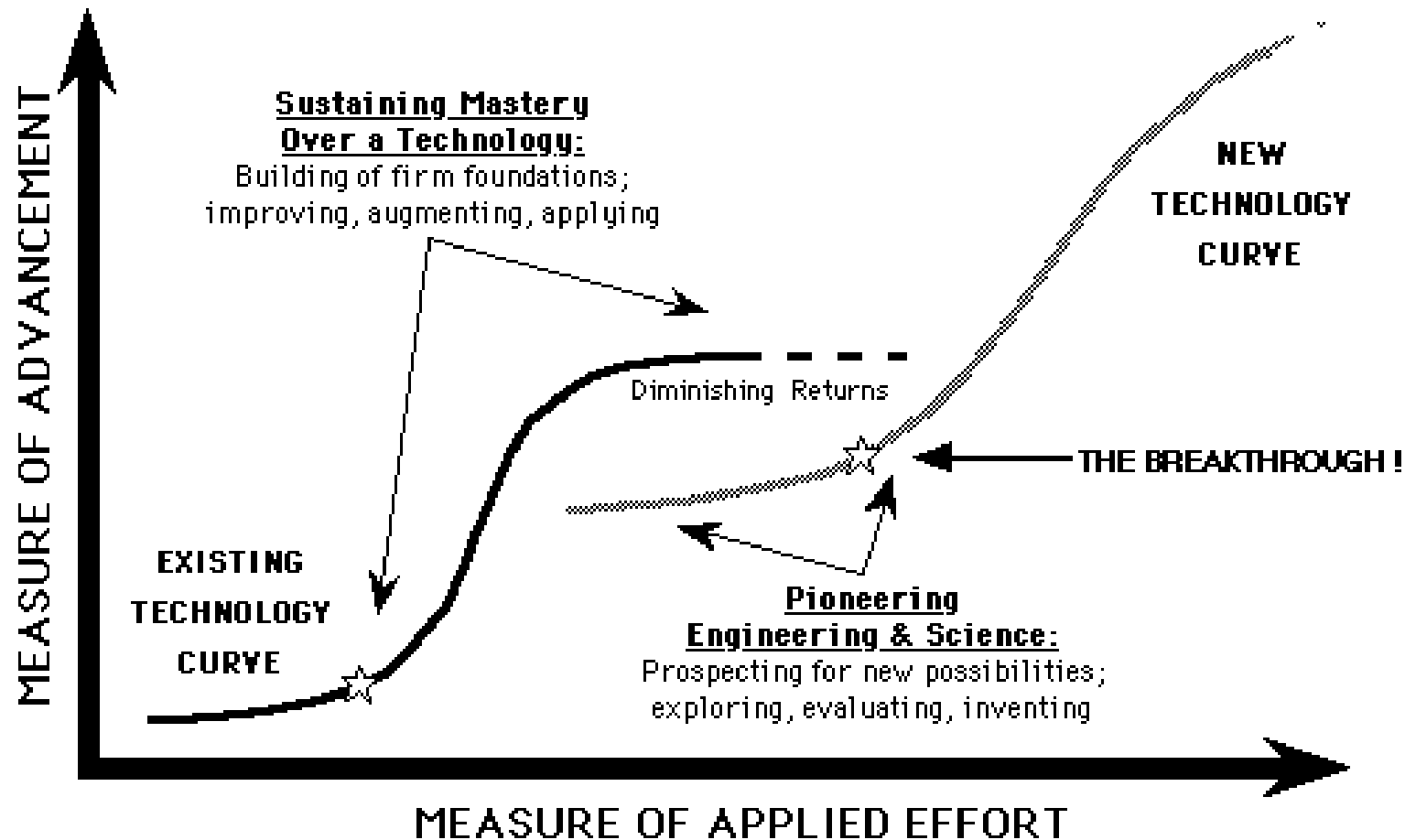


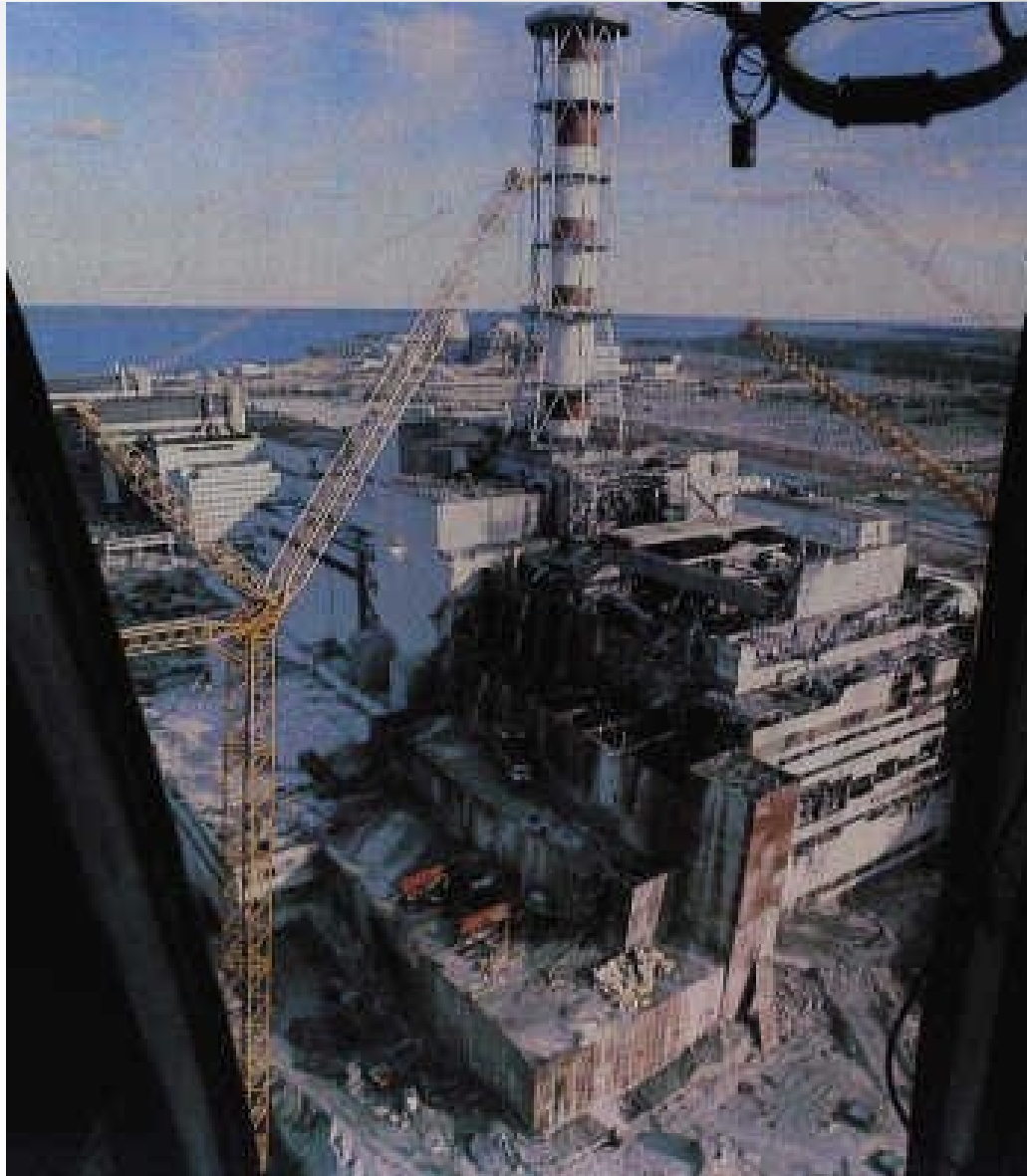






## TECHNOLOGY EVOLVES

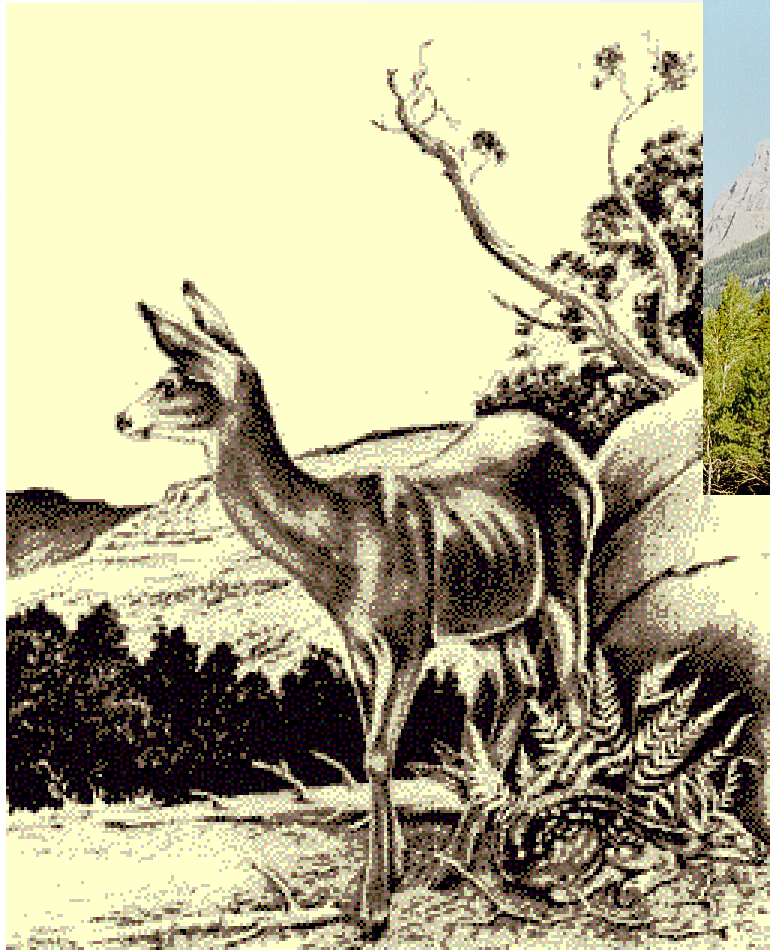








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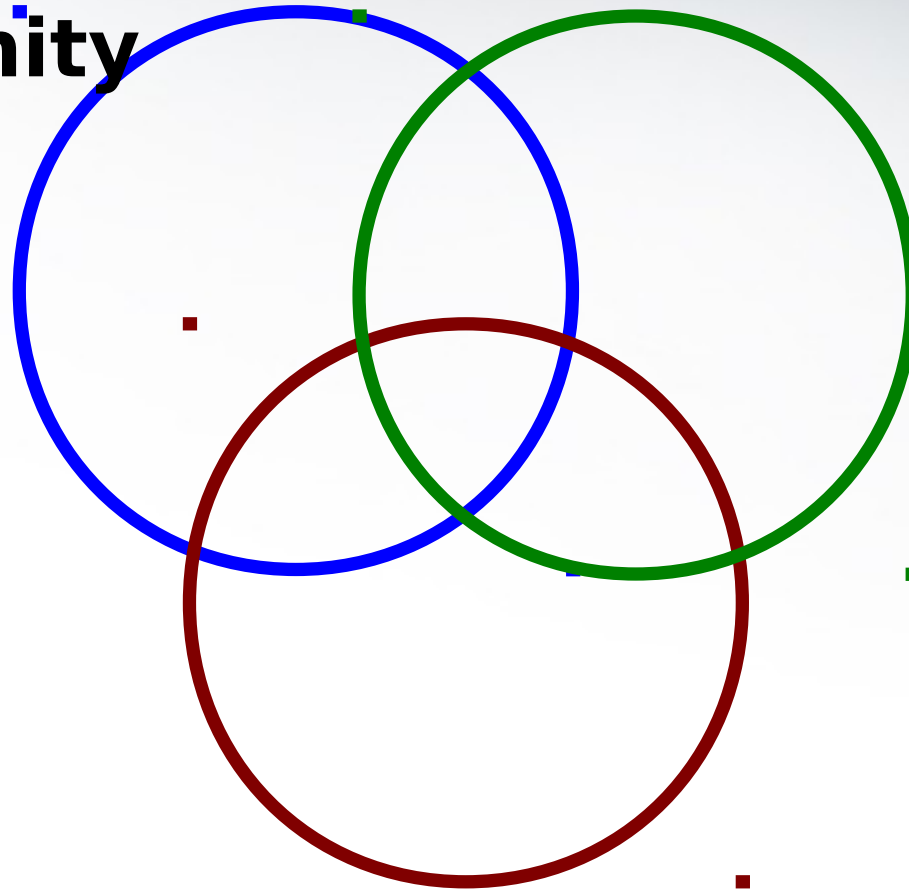


# Sustainable Development



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***Society***

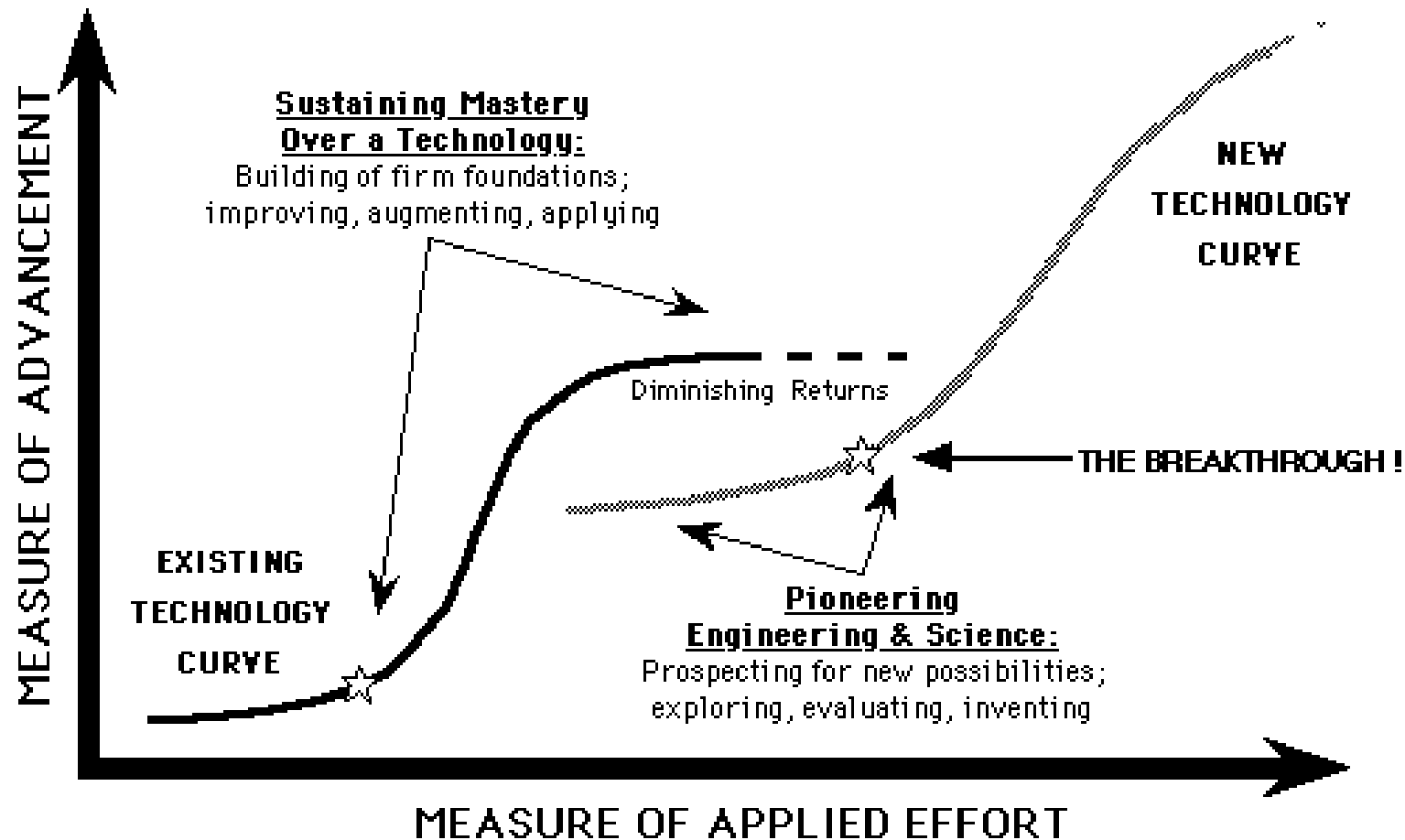
**Mission**  
***Economy***



**Environment**



## TECHNOLOGY EVOLVES



# Concluding Thoughts

















# Houston Advanced Research Center



**Thanks!**

**The Woodlands, Texas**  
**[www.harc.edu](http://www.harc.edu)**